

10/728,772

REMARKS

This Request for Reconsideration is being filed in response to the Final Office Action dated January 4, 2006. For the following reasons, this application should be considered in condition for allowance and the case passed to issue.

Claims 1 and 4-17 were rejected under 35 USC §103(a) as being unpatentable over Uzoh, et al. (hereafter "Uzoh"), Gaw, et al. (hereafter "Gaw") and Wagganer and further in view of Deligianni, et al. (hereafter "Deligianni"). This rejection is hereby traversed and reconsideration and withdrawal thereof are respectfully requested. The following is a comparison of the present invention with the applied references.

As provided in previously amended claim 1, embodiments of the present invention provide a method of forming an interlevel dielectric (ILD) layer comprising the steps of forming a polymer sacrificial ILD on a substrate and forming a photomask on the polymer sacrificial ILD. Recesses are etched in the polymer sacrificial ILD through the photomask. Metallization structures are formed within the polymer sacrificial ILD while the photomask is on the polymer sacrificial ILD. This includes depositing copper within the recesses in the polymer sacrificial ILD and forming a metal cap layer on the copper deposited within the recesses. The polymer sacrificial ILD is etched back. Non-conformally depositing dielectric material is then provided as an ILD layer over the substrate and the metallization structures so as to form air gaps in the ILD layer between at least some of the metallization structures. None of the references, either alone or in combination, show or suggest the embodiments of the invention as currently claimed.

The Examiner states on page 2 of the office action that the previous arguments presented by Applicant are moot in view of the newly cited references of Wagganer and Deligianni. This was because, according to the Examiner, Wagganer and Deligianni provide teaching of the formation of

10/728,772

metal lines with Uzoh's caps while a photomask is in place on the polymer ILD. This statement is a total mischaracterization of the Wagganer and Deligianni teachings, since neither reference discloses or suggests the formation of caps while the photomask is in place. A detailed discussion of the references is provided below.

Uzoh, relates to a method of building a multi-level structure and describes a process in which recesses are formed in a dielectric layer and a photomask is then removed. Only after the photomask is removed is the metal deposited over the dielectric layer. Figure 12 shows a structure in which the dielectric layer has been removed and caps are employed over the copper. However, formation of the metal caps is not detailed and there is no suggestion for forming the caps while the photomask is in place on the ILD layer. Uzoh therefore provides no suggestion as to how to correct the same concerns of misalignment as depicted in the prior art figures 1-3 described in the present application. Certainly, Uzoh provides no suggestion for forming caps while a photomask is in place. In fact, Uzoh removes the photomask even before the metal underlying the caps is deposited. Hence, the photomask is but a distant memory when the caps are formed.

Gaw relates to a method and structure for reducing interconnect system capacitance through encased voids in a dielectric layer. Gaw fails to disclose any suggestions as to the formation of caps while a photomask is in place, and does not overcome any of the deficiencies noted with respect to Gaw.

Wagganer was cited by the Examiner as providing teaching of the formation of metal lines with Uzoh's cap while a photomask is in place on the polymer ILD. However, this reliance upon Wagganer by the Examiner is entirely misplaced. In fact, Wagganer teaches away from forming a cap of any sort while the photoresist is in place, and instead teaches an alternative method.

10/728.772

The Examiner recognizes that Wagganer teaches depositing a metal layer over the top surface of a photoresist layer and filling a trench with the metal. This is followed by a planarization step. Hence, the metal completely fills the recess and actually covers the dielectric layer. There is no room for a cap to be formed prior to the removal of the photoresist layer. But the Examiner ignores this fact in the rejection.

The Examiner also states that Wagganer discusses an optional dielectric cap layer on the last metallization layer. However, Wagganer actually teaches away from the use of a photoresist layer to form the caps. Referring to column 8, lines 30-34, Wagganer states "The photoresist layer 308 and 316 are then removed, using, e.g., a wet etch process, leaving gaps around metal line 324 and underlying metal contact 326. This is followed by the optional step of forming a capping layer 328 over the portions of the layer stack that are unshadowed from the top perspective..." Hence, the teaching of forming a cap is positively recited by Wagganer as occurring after the removal of the photoresist layer. This is in direct contravention to the claimed requirement that caps are formed while the photomask is in place on the polymer H.D layer. To say otherwise is an attempt to rewrite the clear teachings of Wagganer in order to cobble together a rejection. However, such a wholesale reconstruction of Wagganer in order to suit the needs of a rejection based on impermissible hindsight, is an approach wholly rejected by decisions of the Court of Appeals for the Federal Circuit.

Deligianni also fails to disclose the formation of a cap while the photoresist is in place. The Examiner relies on Figures 6A-6C and refers to paragraph 32. However, these figures and disclosure merely show the formation of a deposited metal 110 forming a contact (with no cap), followed by the stripping off of the photoresist mask 72. The Examiner has pointed to no portion of

10/728,772

Deligianni that even remotely suggests the formation of a cap while the photoresist material 72 is in place.

In summary, Uzoh fails to teach the formation of a cap while a photoresist material is in place. Gaw fails to disclose any formation of caps. Deligianni fails to disclose any formation of caps. Wagganer teaches an optional dielectric cap, but one that is only formed after the removal of the photoresist mask. No matter how one combines the teachings, no combination of the references can be said to show or suggest formation of a cap while the photomask is in place on the ILD. A rejection of claims for obviousness must be based on facts, and the facts above clearly do not support a rejection for obviousness.

For the above reasons, as well as other reasons, the rejection of claims 1 and 4-17 based on a combination of Uzoh, Gaw, Wagganer and Deligianni under 35 USC §103 is not supportable in either law or fact. Accordingly, the rejection of these claims under 35 USC §103 should be reconsidered and withdrawn and such action is courteously solicited.

In light of the remarks above, this application should be considered in condition for allowance and the case passed to issue. If there are any questions regarding this amendment or the application, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including

10/728,772

extension of time fees, to Deposit Account 502624 and please credit any excess fees to such deposit account.

Respectfully submitted,

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